

CLAIMS

What is claimed is:

1. A plasma processing control system, comprising:
 - a probe coupled to an electrode of a plasma processing chamber and a radio frequency (RF) generator, wherein the probe is configured to provide data pertaining to a plurality of electrical parameters when the RF generator is energized;
 - a processor coupled to the probe and configured to provide a plurality of harmonics for each of the plurality of electrical parameters; and
 - a controller coupled to the processor and configured to select a predetermined one of the plurality of electrical parameters and a predetermined one of the plurality of harmonics for endpoint detection of a plasma processing step.
2. The plasma processing control system of claim 1, wherein the RF generator provides a frequency of about 2 MHz.
3. The plasma processing control system of claim 1, wherein the RF generator provides a frequency of about 27 MHz.
4. The plasma processing control system of claim 1, wherein the RF generator provides a frequency of about 60 MHz.
5. The plasma processing control system of claim 1, wherein the plurality of electrical parameters includes voltage.
6. The plasma processing control system of claim 1, wherein the plurality of electrical parameters includes phase.
7. The plasma processing control system of claim 1, wherein the plurality of electrical parameters includes current.

8. The plasma processing control system of claim 5, wherein the plurality of harmonics includes first and second harmonics.
9. The plasma processing control system of claim 6, wherein the plurality of harmonics includes first and second harmonics.
10. The plasma processing control system of claim 7, wherein the plurality of harmonics includes first and second harmonics.
11. The plasma processing control system of claim 1, wherein the predetermined one of the plurality of harmonics is other than a first harmonic.
12. The plasma processing control system of claim 1, wherein the plasma processing step includes dielectric etching.
13. A method for detecting an endpoint for a plasma processing step in a plasma processing chamber, comprising:
 - receiving first data identifying a given electrical parameter and a given harmonic of the given electrical parameter;
 - providing a plasma processing control system, including
 - a probe coupled to an electrode of the plasma processing chamber and a radio frequency (RF) generator, wherein the probe is configured to provide second data pertaining to a plurality of electrical parameters when the RF generator is energized, and
 - a processor coupled to the probe and configured to provide third data from the second data, the third data pertaining to a particular harmonic for a particular electrical parameter of the plurality of electrical parameters, the particular electrical parameter being of the same type as the given electrical parameter, the particular harmonic being of the same order as the given harmonic; and
 - employing the third data for the detecting.

14. The method of claim 13 wherein the first data further includes parameters identifying expected endpoint characteristics in the given harmonic of the given electrical parameter.

15. The method of claim 14 wherein the given harmonic is other than a first order harmonic of the given electrical parameter.

16. The method of claim 15, wherein the RF generator provides a frequency of about 2 MHz.

17. The method of claim 15, wherein the RF generator provides a frequency of about 27 MHz.

18. The method of claim 15, wherein the RF generator provides a frequency of about 60 MHz.

19. The method of claim 15, wherein the plurality of electrical parameters includes voltage.

20. The method of claim 15, wherein the plurality of electrical parameters includes phase.

21. The method of claim 15, wherein the plurality of electrical parameters includes current.

22. The method of claim 13, wherein the plasma processing step includes dielectric etching.